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The mediating role of coping between self-reported health complaints and functional limitations, self-assessed work ability and work status of long-term sick-listed cancer survivors

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Submitted

ABSTRACT

Our purpose was to investigate the possible mediating role of active and passive coping between self-reported health complaints and functional limitations, as assessed by an insurance physician (IP), self-assessed work ability, and work status in cancer survivors on long-term sick leave. Validated questionnaires were used for self-reported health complaints, work ability and work status. The functional limitations of the respondents were transformed into scales for mental and physical limitations, and limitations in working hours. Using Lisrel, we constructed a model with coping in a mediating role. Active coping mediated between fewer self-reported physical limitations, more depressive symptoms, better cognitive functioning and more fatigue on the one hand, and more physical limitations and limitations in working hours on the other hand. Passive coping played no mediating role and was associated with more self-reported depressive symptoms only. More functional limitations were associated with lower self-assessed work ability of cancer survivors, and with not being at work, whereas higher self-assessed work ability was associated with being at work. Regarding the role of active and passive coping strategies in cancer survivors on long-term sick leave, more longitudinal research is needed to confirm causality.

BACKGROUND

In the previous years, the incidence and prevalence of cancer have increased. As a result of new developments in early detection and treatment modalities, the survival rate has increased as well (1-4). Because of this, nowadays, cancer can be more considered a chronic condition and less as a terminal illness (2). However, recovery from cancer and surviving cancer may come with complaints, as a result of diagnosis and treatment, that are long-term or even permanent (5). Long-term complaints of cancer survivors, such as fatigue, depressive symptoms, and physical complaints, may influence daily functioning, including (potential) work participation of all workers, either self-employed, employed, or temporarily unemployed (6). Also, specifically in cancer survivors with jobs characterised by a cognitive or emotional workload, fatigue can have a negative impact on mental capacity. As a result, they can experience problems on tasks that demand long-term concentration and attention (7). Further, physical complaints can play a negative role when physical workload is substantial. Moreover, a combination of cognitive and physical job demands can make return to work (RTW) even more difficult.

RTW of cancer survivors is important for the individual and society. From the societal perspective, it is important to reduce avoidable work incapacity, which may lead to economic loss. For the individual, loss of work often means financial loss (8). Also, participation in work is important for the identity, as it provides a social connection and relates to health perception. Furthermore, RTW after cancer treatment enables a person to regain a sense of normality and control (9;10). It is a symbol of recovery, raises the self-esteem and can help to overcome the negative effects of treatment (9;11). Being able to work is viewed by persons suffering from an illness as the third most important aspect of quality of life, after the ability to get out and to engage in social activities (12;13).

In the Netherlands, as sick-listed workers approach a two-year sick leave term, their functional limitations are assessed by an insurance physician (IP), working for the Dutch Social Security Agency (SSA) (14). In 2013, over 4200 workers diagnosed with cancer applied for a work disability benefit. Of these, almost 1600 were granted a complete and permanent work disability benefit. Another 1100 were

granted a complete work disability benefit on a temporary basis. It is expected that in future the number of claims of cancer survivors will increase, since both the retirement age and the mean age of workers will increase (15;16). Therefore, research on vocational rehabilitation of cancer survivors calls for ongoing attention.

Previous studies have reported an association between self-assessed work ability and RTW (17;18). Consequently, the way cancer survivors handle their disease, treatment and side effects, possible loss of control and changing roles could be related to coping behavior and strategies. An influential theory in understanding adjustment to stressors, such as cancer, is Lazarus and Folkman's Stress and Coping model (19;20). In this model, coping is defined in terms of strategies to handle demands that go beyond perceived resources. The model states that the reaction to a potential stressor is mediated by the individual's cognitive appraisals and consequently direct the coping response. According to Stanton et al. (21), in cancer survivors, coping strategies are applied in two ways, i.e., for problem solving and managing cancer-related distress. These strategies are usually classified as active or passive (22). Active coping strategies refer to cognitive or behavioral efforts to alleviate stressful circumstances, and passive coping strategies refer to being focused on the emotional response to a problem. Alternatively, coping strategies have been defined as either approach coping (strategies directed towards a threat) or avoidant coping (strategies that deflect from a threat) (23).

Several studies in cancer survivors report positive associations of active coping and negative associations of passive coping with health indicators (24;25). In outpatients with metastatic colorectal cancer, Unger et al. (24) found that internal health beliefs, considered as a form of active coping, were positively associated with health-related quality of life. Opposite to this, passive coping strategies, together with depression and neuroticism, were negatively associated with health-related quality of life. In a meta-analysis, Roesch et al. (23) found that regarding prostate cancer, men who followed an active approach, were better off psychologically and physically than men who were less active, and used more avoidant coping strategies. In a cross-sectional study on coping in breast cancer survivors, Bishop & Warr (25) found that active coping was associated with less disability, while passive coping was associated with greater disability. If the same association applies to coping

strategies and RTW or vocational rehabilitation, RTW of cancer survivors may be enhanced by addressing their coping strategies.

Therefore, the aim of our study was to investigate whether coping plays a mediating role (26;27) in the associations between self-reported health complaints and (a) functional limitations, as assessed by an IP, (b) self-reported work ability and (c) work status. We expected that self-reported health complaints were associated with an active and/or passive coping strategy. Also, we expected that an active and/or passive coping strategy was associated with (a) functional limitations, as assessed by an IP, (b) with self-assessed work ability and (c) with being at work.

METHODS

Study design and procedure

The present study was part of a longitudinal cohort study with a baseline measurement (T0), i.e., at the end of the two years sick leave term, and one year follow-up (T1). The Medical Ethical Commission (MEC) of the VU University Medical Center (VUmc) in Amsterdam (the Netherlands) gave permission for the study under the condition that cancer survivors on active treatment with chemotherapy and/or radiotherapy were excluded. For the present cross-sectional study, we used the baseline measurement of the cohort, for which self-reported questionnaire data were gathered and informed consent was given. Also, data were retrieved from the SSA, including a list of functional limitations, as assessed by an IP.

All cancer survivors (one-third of them was still working) who applied for a work disability benefit at the SSA from July 2011 until January 2012 were screened. They were potentially eligible for participation if they submitted a first application and had a diagnosis of cancer (multiple tumour sites). All potentially eligible participants were sent a questionnaire on receipt of their work disability application. The returned questionnaires were assessed on exclusion criteria, as formulated by the researchers and approved by the MEC.

Measures

According to a previously described method of factor analyses and internal consistency analyses (28-30), the functional limitations of cancer survivors (Functional Ability List; FAL), as assessed and documented by the IPs, were converted into three additive scales: (1) mental limitations (FALM), (2) physical limitations (FALP), and (3) limitations in working hours (FALH). Because the three scales were highly skewed, their values were transformed into ordinal variables with three classes (0 = no limitations, 1 = limitations, 2 = severe limitations).

With the questionnaire, background characteristics, hereafter named exogenous variables, such as socio-demographics, work- and disease-related characteristics were obtained (see table 6.1). The questionnaire also held items related to self-reported health complaints, coping, self-reported work capacity, and work status (hereafter named endogenous variables, see table 6.1). The following self-reported health complaints using validated Dutch versions of questionnaires, were measured:

Table 6.1 Exogenous and endogenous variables

Exogenous variables*	Mean	Med	SD
Age in years	52.4	53.2	7.58
Education (scale 1-5) †	2.99	3.00	0.86
Job hours (scale 1-4) ‡	2.87	3.00	0.93
Job tenure in years	25.7	26.0	10.75
Kind of job exposure (scale 0-3) §	1.75	2.00	0.85
	%		
Nonnative Dutch; yes	10.2%		
Temporary contract; yes	20.1%		
Shift work; yes	30.8%		
Commercial services; yes	16.5%		
Comorbidity; yes	7.1%		
Breast cancer; yes	47.0%		
Radiotherapy; yes	61.0%		
Chemotherapy; yes	72.3%		
Hormonal therapy; yes	34.3%		

Table 6.1 Exogenous and endogenous variables (continued)

Endogenous variables ¶	Mean	Med	SD	Min	Max	Alpha
SIPB (rec) (scale 0-2) **: SIP of body care and movement	0.84	1.00	0.83	0.0	2.0	0.73
SIPA (rec) (scale 0-2) **: SIP of ambulation	0.75	0.50	0.83	0.0	2.0	0.68
QLG: global health	57.09	58.33	20.22	0.0	100.0	0.89
QLP: quality of life of physical functioning	71.84	73.33	16.90	20.0	100.0	0.71
QLR: quality of life of role functioning	49.77	50.00	27.56	0.0	100.0	0.86
QLE: quality of life of emotional functioning	61.83	66.67	28.14	0.0	100.0	0.90
QLC: quality of life of cognitive functioning	59.55	66.67	29.64	0.0	100.0	0.74
QLS: quality of life of social functioning	59.98	66.67	28.85	0.0	100.0	0.79
FACIT-F: fatigue	27.60	27.00	10.97	3.0	52.0	0.87
CES-D: depressive symptoms	17.05	15.00	11.37	0.0	57.0	0.77
WAIC: work ability	4.13	4.00	2.35	0.0	10.0	NA
UCLA: dimension active coping	0.0	-0.03	1.0	-2.86	3.06	NA
UCLP: dimension passive coping	0.0	0.02	1.0	-2.82	2.67	NA
FALM (rec) (scale 0-2) **: mental limitations	0.98	1.00	0.86	0.0	2.0	0.59
FALP (rec) (scale 0-2) **: physical limitations	0.99	1.00	0.81	0.0	2.0	0.65
FALH (rec) (scale 0-2) **: limitations in hours of work	0.88	1.00	0.70	0.0	2.0	0.92
	%					
WORK: having paid work: (yes)	32.0%					

* n=364, med=median, sd=standard deviation; † Education: 1= primary school, 2=lower vocational education, 3=vocational education/upper secondary school, 4=upper vocational education, 5= university; ‡ Job hours (in hours): 1=0 (not working), 2=7-24, 3=25-36, 4=>36; § Kind of job exposure: 0=not applicable, 1=largely psychic, 2=psychic and physical, 3=largely physical; ¶ yes is favorable direction; ¶ After imputation, before normalization; n=364; rec=recoded, med=median, sd=standard deviation, min= minimum value, max=maximum value, alpha=Cronbach's alpha, NA=not applicable; UCLA & UCLP: factor scores of the coping measurement model, a high score is more coping; Favorable direction of other variables: for SIPB, SIPA, CES-D, FALM, FALP, FALH: low score; for QLG, QLP, QLR, QLE, QLC, QLS, FACIT-F, WAIC, age, education, job hours, job tenure: high score; for job exposure: more physical. ** 0= no limitations, 1=limitations, 2=severe limitations. Model fit parameters of coping measurement model (constructed with the 7 UCL scales): Degrees of Freedom = 6; Normal Theory Weighted Least Squares Chi-Square = 3.932 (p = 0.686); Root Mean Square Error of Approximation (RMSEA) = 0.0; Normed Fit Index (NFI) = 0.993; Standardized Root Mean Square Residual (SRMR) = 0.0184.

- Fatigue (using the Functional Assessment of Chronic Illness Therapy-Fatigue Scale; FACIT-F). The FACIT-F is a 13-item questionnaire (all items scored on a five-point Likert scale) with a range of 0 to 52; a higher score on this scale means less fatigue (31-34).
- Depressive symptoms (using the Center for Epidemiologic Studies Depression Scale; CES-D). The CES-D consists of 20 items with a four-point Likert response scale. The scores range from 0 to 60; a score ≥ 16 is an indicator of probable depression. Higher scores mean a higher burden (35-37).
- Quality of life (using the European Organisation for Research and Treatment of Cancer Quality of Life Questionnaire-C30; EORTC-QLQ-C30), with the global health scale (QLG) and five functional scales, namely physical (QLP), role (QLR), cognitive (QLC), emotional (QLE) and social functioning (QLS), all with a range in score from 0 to 100. For Global health (QLG) a high score represents a high quality of life and for the functional scales a high score represents a high / healthy level of functioning (38-40).
- Physical limitations due to sickness (using the Sickness Impact Profile; SIP), with the subscale body care and movement (SIPB) and the subscale ambulation (SIPA), both with a range in score from 0 to 100 in which a high score indicates more health problems (41-43). These variables were transformed into ordinal variables with three classes (0= no limitations, 1= limitations, 2= severe limitations).
- Self-reported work ability (using the Work Ability Index WAI) (44;45), with the general question that asks participants to estimate their current work ability (WAIC) compared to their lifetime best work ability. It has a range from 0 to 10 with a high score indicating a better work ability.
- Coping (using the Utrecht Coping List; UCL) (46-49), covering seven coping strategies i.e., 'active tackling', 'palliative reacting', 'avoidance', 'seeking social support', 'passive reacting', 'expression of emotion', and 'reassuring thoughts'. For each scale all items are scored with a four-point Likert response scale, with a higher score meaning a greater tendency to behave in conformity with the strategy tested.

Work status of participants (WORK) was assessed using the question 'Are you currently fully or partially (again) at work'; the answer 'Yes, I have paid work' was considered confirmatory positive.

Analysis

The representativeness of the included participants related to gender and age was compared to all potentially eligible participants, and found to be satisfactory. In order to analyse the most relevant exogenous variables, possible confounding variables were identified using regression analysis. Variables that were left in the last step of the regression analysis were selected if $p < 0.10$. Next, the seven coping strategies of the UCL were reduced into two dimensions, postulating two latent variables in the coping measurement model: a more active coping dimension and a more passive coping dimension (UCLA and UCLP). Further, with the 'International Classification of Functioning, Disability and Health' model as global starting point (Figure 6.1), we constructed a basic structural model in which the direct effects of self-reported health complaints on functional limitations, as assessed by an IP, were as follows:

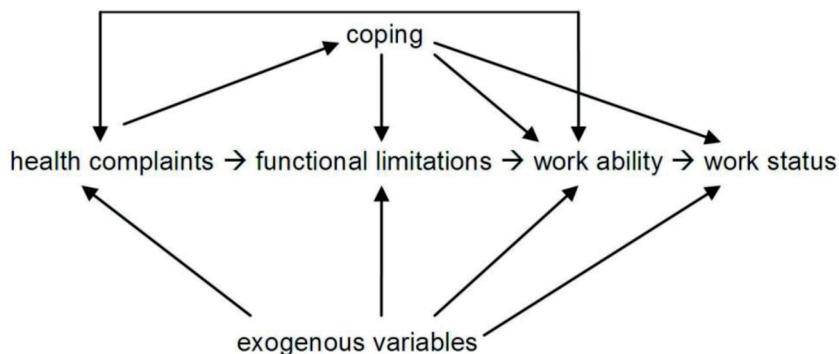


Figure 6.1 The research model in this study

- Self-reported limitations related to physical functioning, and quality of life related to physical functioning have direct effects on physical limitations, as assessed by an IP.

- Quality of life concerning role, emotional, cognitive and social functioning, self-reported fatigue, depressive symptoms, and lower self-assessed work ability have direct effects on mental limitations, as assessed by an IP.
- Self-reported quality of life concerning global health, self-reported fatigue and depressive symptoms have direct effects on limitations in working hours, as assessed by an IP.

In the basic (structural) model, we assumed functional limitations, as assessed by an IP, to have direct effects on self-assessed work ability, which in turn has a direct effect on having paid work (again). The associations between the endogenous variables, i.e., health complaints and work ability, were modelled as associations of disturbance terms (i.e., unexplained variances). Direct effects of the coping variables (UCLA and UCLP) on the other relevant endogenous variables (FALM, FALP, FALH, WAIC, and WORK) were implemented if the related bivariate correlation was > 0.10 . Also, in the basic model only exogenous variables with a significant direct effect on endogenous variables were selected. From the basic model, we selected the significant estimated direct effects and associations between the disturbance terms. Then, a final (structural) model was fitted. All models were constructed using Lisrel (50).

RESULTS

Study population

Between July 2011 and January 2012, 26,464 disability benefit applications were received, of which 1,615 reported a diagnosis of cancer. Of these, cancer survivors with a sick leave period less than two years ($n=343$) were excluded. Next, eligible participants ($n = 1272$) were sent a questionnaire of whom 662 responded (52%). Of these, 98 respondents were excluded as they were still under treatment with chemotherapy and/or radiotherapy. Also, 80 respondents were excluded based on additional data of the SSA and 120 respondents were excluded, as a completed FAL was missing. In total, 364 respondents were included in this cross-sectional study.

For these 364 respondents, the FAL contained functional limitations, as assessed and noted by the IP.

Exogenous variables

The exogenous variables of the 364 respondents that tested significantly in the regression analyses (cut-off for p-value <0.10) are shown in table 6.1. The variables that were not significant (gender, having children, being bread winner, marital status, having managerial tasks, company size, metastatic disease, ongoing treatment, number of treatment modalities) were left out of further analyses.

The majority (68%) of the included respondents were women, were in a relationship (78%), and 74% had children. The mean age was 52 years, and 10% was non-native Dutch. About 30% of respondents had irregular working hours, 17% had managerial tasks, and mean job tenure was 26 years. Comorbidity was reported by 7% of respondents and 44% reported metastatic disease. Of the respondents, 47% had breast cancer; the other 53% had other sorts of cancer, such as cancer of the urogenital (13%) or digestive system (11%). The majority of respondents reported a treatment history of chemotherapy (72%) and/or radiotherapy (61%).

Endogenous variables

In table 6.1, descriptive statistics and Cronbach's alpha of the endogenous variables are presented. The reliability of the scale for mental limitations (FALM) and physical limitations (FALP) were relatively low, but acceptable. Regarding actual work status, 32% of respondents were at work, either partially or fully.

Coping measurement model

The seven UCL coping scales all had a moderate to good reliability, with Cronbach's alphas ranging from 0.68 ('avoidance' and 'reassuring thoughts') to 0.85 ('seeking social support'). The coping measurement model had a good fit and showed that the active coping dimension (UCLA) loaded on the scales for 'active tackling', 'palliative reacting', 'seeking social support' and 'reassuring thoughts' with standardized factor loadings of 0.39, 0.88, 0.41 and 0.50, respectively. The passive coping dimension (UCLP) loaded on the scales for 'palliative reacting',

‘avoidance’, ‘passive reacting’ and ‘expression of emotion’, with standardized factor loadings of 0.40, 0.51, 0.66 and 0.64, respectively.

Final structural model

Since the basic (structural) model had an important number of direct effects that were not statistically significant (data not shown), the model was adjusted into a final (structural) model. In table 6.2, direct effects of exogenous variables on endogenous variables are presented. The size of the (standardised) coefficients of most of these effects was less than 0.16, with four exceptions for stronger associations: a temporary contract with having no work ($\beta = 0.25$), older age with a higher score for emotional functioning ($\beta = 0.19$), higher education with more active coping ($\beta = 0.18$), and breast cancer with more active coping ($\beta = 0.25$).

In table 6.3, direct effects and associations between endogenous variables in the final model are presented:

- More physical limitations (FALP) were associated with more physical health complaints (SIPA, SIPB, QLP), and with not having paid work (WORK). There was no association between physical limitations (FALP), and a lower self-assessed current work ability (WAIC).
- More mental limitations (FALM) were associated with poorer cognitive functioning (QLC), more self-reported fatigue (FACIT-F), and lower self-assessed current work ability (WAIC). They were not associated with a lower quality of life concerning role, emotional, and social functioning (QLR, QLE, QLS), nor with more depressive symptoms (CES-D). More limitations in working hours (FALH) were associated with more self-reported fatigue (FACIT-F), and with lower self-assessed current work ability (WAIC). More limitations in working hours were not associated with a lower self-reported global health (QLG), nor with more depressive symptoms (CES-D). Instead, there was a weak association with fewer depressive symptoms (CES-D).
- Lower self-assessed current work ability (WAIC) was associated with not having paid work (WORK).

Only two ‘Modification Indices’ in the final (structural) model were significant, suggesting: a) a direct effect from mental limitations (FALM) to limitations in

Table 6.2 Direct effects from exogenous to endogenous variables in conformity with the final model

From	Temporary contract	Age	Education	Non-native Dutch	Job hours	Shift work	Kind of job exposure	Sector commercial services	Job tenure	Co-morbidity	Radiotherapy	Chemotherapy	Hormonal treatment	Breast cancer
To														
SIPB			-0.11	0.11						0.10				
SIPA			-0.13	0.09										-0.09
QLG				-0.13					0.10					0.10
QLP			0.14	-0.15										
QLR							-0.09					0.08		
QLE	-0.12	0.19	0.07	-0.12		-0.10		-0.07	-0.08	-0.07	0.07	-0.09	-0.07	-0.11
QLC		0.09		-0.08	-0.12									
QLS				-0.13	-0.09								0.11	
FACIT-F				-0.11					0.09			0.07		
CES-D	0.08	-0.11		0.16										0.10
UCLA			0.18											0.25
UCLP		-0.13	0.12								-0.08		-0.07	
FALM	0.13		0.12							-0.11				
FALP		0.09			-0.12									
FALH	-0.10											0.11		-0.15
WAIC	-0.12													
WORK	0.25				-0.09		0.09		-0.09			0.12		-0.13

All coefficients have been standardised ($p \leq 0.05$), except coefficients in *italic* ($0.05 < p \leq 0.10$). SIPB: sickness impact of body care and movement. SIPA: sickness impact of ambulation (for SIPB & SIPA: a low score is less sickness impact). QLG: global health. QLP: quality of life of physical functioning. QLR: quality of life of role functioning. QLE: quality of life of emotional functioning. QLC: quality of life of cognitive functioning. QLS: quality of life of social functioning (for all Quality of Life scales: a high score is better quality of life). FACIT-F: fatigue (a high score is less fatigue). CES-D: depressive symptoms (a low score is less symptoms). UCLA: dimension of active coping. UCLP: dimension of passive coping (for UCLA & UCLP: a high score is more coping). FALM: mental limitations. FALP: physical limitations. FALH: limitations in hours of work (for all FAL scales: a low score is less limitations). WAIC: work ability (a high score is more work ability). WORK: having paid work now (a low score is having paid work).

Table 6.3 Direct effects and associations between endogenous variables in conformity with the final model

From	SIPB	SIPA	QLG	QLP	QLR	QLE	QLC	QLS	FACIT-F	CES-D	UCLA	UCLP	FALM	FALP	FALH	WAIC
To																
UCLA		-0.13				-0.14	0.18		-0.24	-0.25		fixed				
UCLP	0.09			0.16						0.62						
FALM							-0.22		-0.18					0.12	0.23	
FALP	0.15	0.23		-0.13	-0.10						0.13				0.16	
FALH									-0.42	-0.13	0.11					
WAIC	-0.36	-0.33	0.49	0.50	0.49	0.27	0.27	0.36	0.52	-0.38			-0.10		-0.12	
WORK														0.09		-0.36

All coefficients have been standardised ($p \leq 0.05$), except coefficients in *italic* ($0.05 < p \leq 0.10$). The **bold** coefficients are associations of the disturbance terms (the unexplained variances). The associations of the disturbance terms between the endogenous variables of the self-reported health status (SIPB, SIPA, QLG, QLP, QLR, QLE, QLC, QLS, FACIT-F, CES-D) are not given in the table. SIPB: sickness impact of body care and movement. SIPA: sickness impact of ambulation (for SIPB & SIP A: a low score is less sickness impact). QLG: global health. QLP: quality of life of physical functioning. QLR: quality of life of role functioning. QLE: quality of life of emotional functioning. QLC: quality of life of cognitive functioning. QLS: quality of life of social functioning (for all Quality of Life scales: a high score is better quality of life). FACIT-F: fatigue (a high score is less fatigue). CES-D: depressive symptoms (a low score is less symptoms). UCLA: dimension active coping (a high score is more coping). UCLP: dimension passive coping (a high score is more coping). FALM: mental limitations. FALP: physical limitations. FALH: limitations in hours of work (for all FAL scales: a low score is less limitations). WAIC: work ability (a high score is more work ability). WORK: having paid work now (a low score is having paid work).

Model fit parameters of the final model: Degrees of Freedom = 217; Normal Theory Weighted Least Squares Chi-Square = 179.469 ($p = 0.970$) Root Mean Square Error of Approximation (RMSEA) = 0.0; Normed Fit Index (NFI) = 0.976; Standardized Root Mean Square Residual (SRMR) = 0.0337.

working hours (FALH) and b) an association between the disturbance terms of self-reported fatigue (FACIT-F) and limitations in working hours (FALH). As associations between the involved endogenous variables were already in the final model, no further adjustment of the model was needed. The explained variances in the final model were 15% for active coping (UCLA), 40% for passive coping (UCLP), 17% for mental limitations (FALM), 27% for physical limitations (FALP), 15% for limitations in working hours (FALH), 11% for self-assessed current work ability (WAIC), and 28% for work status (WORK).

The mediating role of coping

The direct effects ($p \leq 0.05$) in the final (structural) model are depicted in figure 6.2 and show the various pathways from self-reported health complaints through coping and/or through functional limitations, as assessed by an IP, to self-assessed work ability and work status.

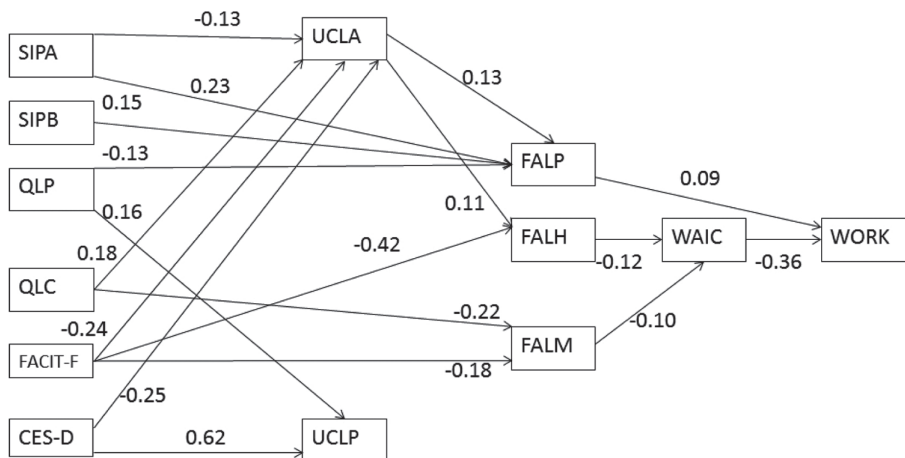


Figure 6.2 Direct effects of the final model

All direct effects have been standardised; only direct effects with $p \leq 0.05$ are shown. SIPA: sickness impact of ambulation; SIPB: sickness impact of body care and movement (for SIPA & SIPB: a low score is less sickness impact); QLP: quality of life of physical functioning; QLC: quality of life of cognitive functioning (for QLP & QLC: a high score is better quality of life); FACIT-F: fatigue (a high score is less fatigue); CES-D: depressive symptoms (a low score is less symptoms); UCLA: dimension of active coping; UCLP: dimension of passive coping (for UCLA & UCLP: a high score is more coping); FALM: mental limitations; FALP: physical limitations; FALH: limitations in hours of work (for all FAL scales: a low score is less limitations); WAIC: work ability (a high score is more work ability); WORK: having paid work now (a low score is having paid work).

Concerning the mediating role of coping, various self-reported health complaints (i.e., SIPA, QLC, FACIT-F and CES-D) had indirect, significant ($p \leq 0.05$) or marginally significant ($0.05 < p \leq 0.10$) associations through active coping (UCLA) with physical limitations (FALP) and limitations in working hours (FALH). However, these indirect associations were small ($\beta < |0.032|$).

DISCUSSION

Most important findings

In this study, the mediating role of coping in the associations between self-reported health complaints and (a) functional limitations, (b) self-reported work ability and (c) work status was examined. We found a small mediating role of active coping (UCLA) between self-reported health complaints and functional limitations (FALM, FALP, FALH), as assessed by an IP. A mediating role of passive coping (UCLP) was not found. Passive coping was only associated with more self-reported depressive symptoms (CES-D) and a higher quality of life of physical functioning (QLP).

Mental limitations (FALM) were associated with poorer cognitive functioning, more self-reported fatigue, and lower self-assessed work ability. We found associations between physical limitations (FALP) and self-reported physical complaints, but not with lower self-assessed work ability. Limitations in working hours (FALH), were associated with more fatigue, and lower self-assessed work ability, but not with global health (QLG), nor with more depressive symptoms. Lower self-assessed work ability was also associated with not having paid work.

Interpretation of the findings

Findings indicate that in cancer survivors, active coping may play a mediating role between more self-reported health complaints, and both more self-reported fatigue and functional limitations. Contrary to our hypothesis, we found no mediating role for passive coping. An explanation could be that, in our study, the active coping dimension and the passive coping dimension measured two different constructs, as they proved to be completely orthogonal to each other. Not surprisingly,

passive coping was associated with more self-reported depressive symptoms and active coping with fewer self-reported depressive symptoms. However, active coping was also associated with more self-reported fatigue; we will discuss this point further on.

Because passive coping loaded heavily on the 'passive reacting' strategy, one may expect a positive association between passive coping and mental limitations (FALM). A possible reason for not finding such a relationship could be that cancer survivors with a passive coping strategy are less inclined to express themselves during the assessment interview with the IP, as they possibly more often tend to avoid a dispute.

In our study, active coping was associated with more physical limitations and limitations in working hours, as assessed by an IP. Possibly, the cancer survivors with an active coping strategy have better cognitive functioning and fewer problems with the impact of physical sickness. As such, a recent meta-analysis reported positive outcomes on psychological well-being and physical health in cancer survivors that used adaptive coping strategies, and avoided disengagement forms of coping (51).

In our study, we also found that more self-reported health complaints and lower self-assessed work ability were associated with physical limitations, mental limitations and limitations in working hours. Mental limitations were not associated with self-reported social, role, and emotional functioning, which in general seem to be important aspects in the context of work participation. Apparently, in assessing the mental capacity, IPs did not consider these aspects, despite the fact that the FAL carries items for social and emotional functioning. It is possible that complaints related to these aspects were not fully recognised by the IP.

The role of coping in cancer survivors

Contrary to the results of previous studies (23-25;52;53), we found that active coping was associated with more functional limitations and, indirectly, with a lower self-assessed work ability and with not having paid work. Nevertheless, we found associations of active coping with fewer self-reported limitations for ambulation, better cognitive functioning (QLC), and fewer depressive symptoms. In our study,

the direction of these associations concur with results of other studies. However, in our study, active coping was associated with more self-reported fatigue. It may be possible that cancer survivors at two-year sick leave, suffering from fatigue, adopt a more active coping style as a strategy to overcome fatigue. Also, it may be possible that people who engage in active coping overcharge themselves and as a result become more fatigued. Moreover, the concept of coping, as assessed in two orthogonal dimensions and studied using a cross-sectional design, rules out the possibility of exploring a more dynamic situation. That is, cancer survivors may use several strategies alternatively, depending on specific circumstances, at different moments in time. More research on this topic is needed to examine which interpretation is valid.

The role of self-assessed work ability

In this study, we found that a higher self-assessed work ability was associated with fewer physical functional limitations (FALP) and less reduction in working hours (FALH). This result concurs with a recent study of disability applicants with all kind of diseases (54) showing that they were capable of predicting the outcome of their work disability benefit application. That is, the combination of a reported low perceived work ability and the expectation of being granted a disability benefit predicted the actual outcome of the disability assessment.

In a prospective study of employed cancer survivors (with various cancers) treated with curative intent, De Boer et al. (17) found that self-assessed work ability, reported during treatment, predicted RTW. This was independent of age and clinical factors. In concordance with this study, we found that higher self-assessed work ability was associated with being at work (again). This is a relevant finding considering the mean age of the population studied (52 years), and the fact that, at time of the data collection, workers in the Netherlands were expected to participate in work until retirement age at 65 years.

Strengths and weaknesses

Strength of our study is that we used validated questionnaires. Also, multivariate analysis was used to examine the associations between self-reported health

complaints, coping, functional limitations, self-assessed work ability and work status, taking into account potential confounders. Furthermore, we believe results of the study have added value as for instance our results concur with results of the aforementioned study by De Boer et al. (17), reporting on longitudinal data of Dutch cancer survivors treated with curative intent. Moreover, as far as we know, this is the first study that examines the mediating role of coping with functional abilities and self-reported health complaints in cancer survivors, who apply for a disability benefit at two-year sick leave. It may serve as a starting point for further research targeting at cancer survivors at risk for work disability.

An important weakness of our study is its cross-sectional design, i.e., causal relations cannot be proved, in spite of the use of a structural model with ‘cause’ and ‘effect’ variables. A third of the questionnaires of respondents was received after the IP completed their FAL. It is possible that the answers of these cancer survivors were influenced by the assessment. Also, it is possible that the cancer survivors who attended the work disability assessment after completing the questionnaire somehow prepared themselves for this assessment. Either way, in theory, our study could have had an impact on the assessment of functional limitations by an IP. Fact is that, in the Netherlands, to support the IP and enhance uniformity in the assessments, in recent years evidence-based guidelines have been introduced. However, despite present guidelines, it is still possible that the assessing IP may be biased in choosing the topics that he/she believes to be important. Consequently, the role of the IP in the assessment seems relevant and may also introduce bias. Also, current legislation related to work disability benefits may introduce a certain bias, in that workers and/or employers may sometimes feel forced to make unfavorable choices in a RTW trajectory, as to prevent a possible financial sanction the SSA may impose. Furthermore, one may doubt whether self-assessed work ability can be measured independently from work status in a cross-sectional design. That is, cancer survivors in paid work may assess their work ability related to actual working conditions.

In addition, a mixed cancer group is used in this study. Cancer is a heterogeneous disease and depending on tumour site and stage the prognosis, treatment, and side-effects of treatment may differ. This may influence the coping strategies

that individual cancer survivors use and, e.g., in those with a very unfavorable prognosis, lead to a predominantly passive coping strategy. Therefore, there may be different (psychological and physical) disease-related outcomes associated with specific coping strategies. Furthermore, we studied the possible role of coping using the results of a measurement model with a broad 'active' and 'passive' dimension. Maybe it would have been more appropriate to study each of the seven coping strategies that the UCL encompasses separately (55;56). Moreover, our results may be influenced by the fact we studied coping without taking coping resources (e.g., optimism and social support) into account.

Relevance for insurance physicians

Considering the results of this study, there is insufficient evidence to advise IPs to support an active coping strategy in cancer survivors on long-term sick leave. More longitudinal research is needed to confirm the role of active and passive coping strategies in these cancer survivors.

To the best of our knowledge, for the first time, an association has been determined between the FAL and self-reported health complaints of cancer survivors, applying for a disability benefit. Results indicate that, in the assessment of functional abilities, IPs may give more attention to cancer survivors' social, role, and emotional functioning. This may eventually support the judgement on limitations, enhance vocational rehabilitation, and RTW of cancer survivors. Consequently, social, role, and emotional functioning in cancer survivors could be addressed during IPs' meetings, being an obligatory part of permanent education related to keeping registration as a physician in the field of insurance medicine. In future research on work disability assessments, the use and added value of a standard topic list, which addresses these items in work disability assessment interviews, should be considered. That is, results indicate that, e.g., items such as parenting and taking part in family life (social functioning), usual daily activities and leisure time activities (role functioning), distress and worries (emotional functioning) should be part of such a list, and always be questioned in assessment of work disability claims of cancer survivors. Other items that may be considered for such a topic list relate to,

e.g., support (by partner, employer and/ or in general), experiences in vocational rehabilitation, and perceived meaning of work (57).

Conclusion

In cancer survivors active coping played only a small mediating role between both physical limitations and limitations in working hours (as assessed by an IP) and depressive symptoms, cognitive functioning, and both self-reported fatigue and physical limitations related to ambulation.

Also, both more self-reported health complaints and lower work ability were associated with more functional limitations (as assessed by an IP). However, self-reported social, role, and emotional functioning were not associated with mental limitations, as assessed by an IP. This is remarkable as these factors seem to be important in the context of work participation. Also, more functional limitations (as assessed by an IP) were associated with not being at work, whereas higher self-assessed work ability was associated with being at work (again).

Authors' contributions

AJMS, PvM and SFAD designed the study. AJMS performed the statistical analysis and wrote a first version of the manuscript. PvM and SFAD revised the manuscript and AJvdB commented on the manuscript. PvM and SFAD designed the questionnaire. PvM, SFAD and AJvdB coordinated the data collection. All authors read and approved the final manuscript.

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Declaration of interest

The authors report no conflicts of interest. Funding sources: AJMS and PvM are funded by the Dutch Social Security Agency. The study sponsor had no (decisive) role in the study design, in the collection, analysis, or interpretation of the data, in the writing of the case reports, or in the decision to submit the paper for publication.

Ethical standards

The authors declare the project to comply with the local regulatory guidelines and standards for human subjects protection in the Netherlands (Medical Research Involving Human Subjects Act (WMO), 2005).

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